



# ICAO ENGINE EXHAUST EMISSIONS DATA SHEET

## SUBSONIC ENGINES

ENGINE IDENTIFICATION: LEAP-1A35A/33/33B2/32/30 BYPASS RATIO: 10.5  
 UNIQUE ID NUMBER: 01P20CM132 PRESSURE RATIO ( $\pi_{co}$ ): 38.5  
 COMBUSTOR: TAPS II  
 ENGINE TYPE: TF RATED THRUST ( $F_{oo}$ ) (kN): 143.1

### REGULATORY DATA

CHARACTERISTIC VALUE:	HC	CO	NO <sub>x</sub>	SMOKE NUMBER
D <sub>p</sub> /F <sub>oo</sub> (g/kN) or SN	0.4	24.1	59.9	1.8
AS % OF ORIGINAL LIMIT	1.9	20.4	51.2	8.5
AS % OF CAEP/2 LIMIT (NO <sub>x</sub> )			64.0	
AS % OF CAEP/4 LIMIT (NO <sub>x</sub> )			71.3	
AS % OF CAEP/6 LIMIT (NO <sub>x</sub> )			78.9	
AS % OF CAEP/8 LIMIT (NO <sub>x</sub> )			89.3	

For non-volatile particulate matter (nvPM) emissions, please refer to the ICAO Engine nvPM Emissions Data Sheet.

### DATA STATUS

- PRE-REGULATION  
 x CERTIFICATION  
 - REVISED (SEE REMARKS)

### TEST ENGINE STATUS

x NEWLY MANUFACTURED ENGINES  
 x DEDICATED ENGINES TO PRODUCTION STANDARD  
 - OTHER (SEE REMARKS)

### EMISSIONS STATUS

x DATA CORRECTED TO REFERENCE  
 (ANNEX 16 VOLUME II)

### CURRENT ENGINE STATUS

(IN PRODUCTION, IN SERVICE UNLESS OTHERWISE NOTED)  
 - OUT OF PRODUCTION (DATE: - )  
 - OUT OF SERVICE (DATE: - )

### MEASURED DATA

MODE	POWER SETTING (%F <sub>oo</sub> )	TIME (minutes)	FUEL FLOW (kg/s)	EMISSIONS INDICES (g/kg)			SMOKE NUMBER
				HC	CO	NO <sub>x</sub>	
TAKE-OFF	100	0.7	1.062	0.05	0.30	59.74	1.1
CLIMB OUT	85	2.2	0.869	0.02	0.24	32.35	1.2
APPROACH	30	4.0	0.284	0.04	1.79	9.95	1.3
IDLE	7	26.0	0.098	0.21	18.68	4.85	1.3
LTO TOTAL FUEL (kg) or EMISSIONS (g)			380	39	3019	7795	-
NUMBER OF ENGINES				2	2	2	2
NUMBER OF TESTS				4	4	4	4
AVERAGE D <sub>p</sub> /F <sub>oo</sub> (g/kN) or AVERAGE SN (MAX)				0.3	21.1	54.5	1.6
SIGMA (D <sub>p</sub> /F <sub>oo</sub> in g/kN, or SN)				0.0	1.1	1.8	0.2
RANGE (D <sub>p</sub> /F <sub>oo</sub> in g/kN, or SN)				0.23-0.31	19.88-22.16	52.3-56.3	1.47-1.82

### ACCESSORY LOADS

POWER EXTRACTION 0 (kW) AT All POWER SETTINGS  
 STAGE BLEED 0 (% CORE FLOW) AT All POWER SETTINGS

### ATMOSPHERIC CONDITIONS

BAROMETER (kPa)	97.8-98.8
TEMPERATURE (K)	274.6-279.8
ABS HUMIDITY (kg/kg)	0.002-0.0032

### FUEL

SPEC	Jet A
H/C	1.9
AROM (%)	16.5

MANUFACTURER: CFM International  
 TEST ORGANIZATION: General Electric Company  
 TEST LOCATION: PTO, Ohio  
 TEST DATES: 21/11/2016-02/12/2016

### NO<sub>x</sub> REGULATION PARAGRAPH

	2.3.2 c) (CAEP/4)
	2.3.2 d) (CAEP/6)
x	2.3.2 e) (CAEP/8)

### REMARKS

1. Ref. Report CRL-2201\_2/Rev. 1
2. Engine S/N 600-104, 600-105
3. SN for each LTO mode is average of max SN for test points around that power setting
4. AVERAGE SN (MAX) is average of maximum SN measured from all points on each run
5. Certification in accordance with Part III, Chapter 2, of Amendment 8 of ICAO Annex 16 Vol. II.
6. NO<sub>x</sub> levels in accordance with Part III, Chapter 2, 2.3.2 e) (CAEP/8)

Compliance with Fuel Venting requirements: x ('x' if complies, 'PR' if pre-regulation, '-' if information is not available)